of combining the double observation for all forecasting purposes, and inquiries in connection therewith; in other words, of combining with the observation at the top of Ben Nevis that made at the same instant near sea-level at Fort William. With the opening of the Low Level Observatory in November will commence a new era in the work of the Ben Nevis Observatory. It will then be possible, by the double set of horizontal meteorological gradients and vertical meteorological gradients thus obtainable, to examine more fully and rigorously the atmospheric changes which precede, accompany, and follow the passage across these islands of the cyclones and anticyclones of North-Western Europe.

The minimum temperature on Ben Nevis for the year was 7 ·2, being the lowest yet observed since the Observatory was opened in 1883. The maximum was 61°·1 in June, which closely agrees with the maxima of previous years, except that of 1887, which rose to 67°·0. It is also to be noted that so late as September temperature rose to 57°·6.

The registrations of the sunshine recorder showed 970 hours of sunshine during the year, the smallest number of hours for any month being 8 for November, and the largest 250 in June, being nearly half the possible sunshine. The number of hours for the four years now observed, beginning with 1885, were 680, 576, 898, and 970. The contrast of the sunshine of 1886 with that of 1888 is thus very striking.

The amount of rainfall for the year was 132·46 inches, the month of least rainfall, 3·76 inches, being June, and of greatest, 20·60 inches, being November. The number of days on which precipitation was *nil*, or less than the hundredth of an inch, was 118. The number of rainless days for the last three years have been 159, 128, and 118. From all the observations yet made, it is seen that a fall, equalling at least 1·00 a day, has occurred on an average of one day in nine.

Atmospheric pressure was this year again above the annual average, the mean at sea-level being 29·889, or 0·055 higher. The lowest mean at the Observatory, 25·035 inches, occurred in March, and the highest, 25·590 inches, in September; the difference being 0·555 inch. At sea-level at Fort William the extreme monthly means were 29·636 inches in November, and 30·132 in September; the difference being 0·496 inch.

NOTES.

MR. GRIESBACH, of the Geological Survey of India, shortly proceeds to Beluchistan to exploit for coal; and Mr. Oldham, also of the Geological Survey, is also going to Beluchistan to investigate and report upon oil fields which are believed to exist there.

THE Iron and Steel Institute has assembled this year in Paris at the rooms of the National Industry Encouragement Society, and its first sitting was held on the 24th inst., under the presidency of Sir J. Kitson. The paper which attracted most attention on the first day was one by M. Schneider, of Creuzot, and M. Hersent, ex-President of the French Civil Engineers' Society, on the Channel Bridge, which gave an elaborate account of the scheme. The route chosen as the line, stretching over the shallowest parts of the Channel and connecting the shores where closest to each other, commences at a point near Cape Gris Nez, passes over the Colbart and Varne banks, and terminates near Folkestone. The Colbart and Varne banks are situated near the centre of the Channel, about 6 kilometres apart, the depth of the water at that point not exceeding 7 or 8 metres at low water, and they are separated from each other by a depression about 25 to 27 metres deep. Between the Varne and the British coast the depth does not exceed 29 metres, but near Colbart the bottom sinks somewhat abruptly down to 40 metres. It then attains 55 metres about midway across, when it begins gradually to rise. In these parts the chief difficulties would be encountered in laying the foundations. The result of repeated experiments is that the ground is found to be sufficiently solid to support very extensive works, and the borings lately made in connection with the proposed tunnel have confirmed preceding experiments as to the position and nature of the bottom as published by M. de Gamond. The metal proposed to be used is steel. The amount of metal and machinery to be provided would represent an aggregate weight of about 1,000,000 tons. The spans of metal would be 500 metres in length across the Channel, supported on columns resting at different depths on the bottom of the sea. A rough calculation gives 380,000,000 francs for masonry supports, and 480,000,000 francs for the metallic superstructure—in all, 860,000,000 francs, or £34,400,000. The time required for the undertaking was fixed at about ten years.

THE eleventh Congress of the Sanitary Institute was opened at Worcester on the 24th inst. In connection with the Congress an exhibition of sanitary appliances and apparatus is being held at the Skating Rink, where also lectures on cookery are given by Dr. Strange. The Presidential address was delivered by Mr. G. W. Hastings, M.P., and referred mainly to recent legislation affecting sanitary science.

THE International Oriental Congress, which was held this year during the first and second weeks of the present month, in Stockholm and Christiania, was well attended, and was especially noticeable for the enlightened and warm interest taken in the proceedings by the King. Representatives of Oriental learning from the chief countries were His Majesty's personal guests, the members of the Congress present were on several occasions specially entertained by him, and in other marked ways the King showed his desire to honour science and learning in the persons of the assembled Oriental scholars. The *Times* is the only one of the English daily papers in which the proceedings have been followed regularly, and in the last letter on the subject, its Correspondent, who has been far from a prophet of smooth things in reference to all the proceedings, says that "this eighth International Oriental Congress was favoured above all its predecessors by the right royal splendour with which the ruler of the two countries entertained his guests, by the warm interest which the citizens took in the foreign *savants*, by the care and kindly forethought with which all the arrangements for our comfort had been planned and were carried out, and last (not least) by the grand and lovely natural features of the places which the members visited. Perhaps at future Congresses care will be taken that there be less of empty Oriental parade, by which no palpable literary object can be gained, and that greater facilities be given for placing without delay within the reach of members an abstract of the proceedings in each Section. However, in the face of such boundless hospitality and such personal sacrifices on the part of our hosts, it would be ungracious were we to take exception to what are after all but small matters of detail."

A LARGE number of papers of great philological and general interest were read, as will be readily gathered from the following list of the Sections, with their respective Presidents and Vice-Presidents:—Section I. Modern Semitic: Presidents—Baron Kremer, of Vienna; M. Schefer, of Paris; M. de Goeje, of Leyden. Section II. Ancient Semitic: President—M. Fehr, of Stockholm; Vice-Presidents—M. Chivolson, of St. Petersburg; M. Oppert, of Paris. Section III.: Presidents—M. Max Müller, of Oxford; M. Weber, of Berlin; M. Spiegel, of Erlangen. Section IV.: President—Brugsch Pasha; Vice-Presidents—M. Lieblein, M. Reinisch. Section V.: President—M. Schlegel, of Leyden; Vice-President—M. Cordier, of Paris. Section VI.: President—M. Kern, of Leyden; Vice-President: Mr. R. N. Cust, of London.

A CORRESPONDENT sends us the following instance of "Science as she is wrote," which he thinks worth preserving. It is extracted from an eloquent description of the icebergs near the coast of Newfoundland, which appeared in the *Daily Telegraph* of September 17, and was signed "Edwin Arnold":—"The icebergs are unfortunately most to be expected in those summer months when alone the navigation is open. The first heats of the brief but hot Arctic sunshine set in rapid motion the glaciers of Labrador and Greenland. These vast storehouses of gathered and consolidated snow glide to the edge of the tremendous precipices of the Winter Lands, and, falling over them in monstrous masses, crash into the deep water with shocks which send thunder-peals through the still Polar air, and perturb the ocean far and near with rolling waves. Then, committed by this awful launch to the southward-going currents, the great broken glittering mass goes solemnly sailing away in the unwonted sunshine. As it floats, the water, warmer than the air, melts its lower portion gradually, and detached pieces also fall from the visible part, until equilibrium becomes destroyed, and the colossal block capsizes with a second shock, startling the ocean for leagues around."

WE have received from the Mansion House a copy of the pamphlet relating to the Mansion House Fund for the Pasteur Institute. Besides a full report of the meeting held on July 1, it contains an excellent introduction describing the aims and needs of the fund, written by the Lord Mayor, and statistics of the work done by anti-rabic institutions in France and elsewhere. The last paragraph of the Lord Mayor's introduction is itself an ample justification of the appeal which he makes, for in it he reports that during July and August he sent over to Paris seventeen poor persons who had been bitten by mad dogs. There they have been treated free of charge, as usual by M. Pasteur. The Honorary Secretary to the Fund is Dr. Rueffer, 26 Torrington Square, London.

THE syllabus of the eighth course of lectures and demonstrations for sanitary officers at the Sanitary Institute during the coming winter has been issued. The introductory lecture, on the general history, principles, and methods of hygiene, by Sir Edwin Chadwick, will be delivered on October 8, and the course will be continued every Tuesday and Friday at 8 p.m. until November 15. Amongst the lectures are: water supply, by Dr. Louis Parkes; drainage and construction, by Prof. H. Robinson; ventilation, by Sir Douglas Galton; sanitary appliances, by Prof. Corfield; scavenging, by Mr. Percy Boulnois; food, by Mr. Cassal; infectious diseases and methods of disinfection, by Mr. Shirley F. Murphy; general powers and duties of inspectors of nuisances, by Mr. J. F. J. Sykes; and sanitary law, by Mr. Wynter Blyth.

THE carrier pigeon has just been turned to a curious use in Russia, according to the *Novoe Vremya*. It is to convey negatives of photographs taken in a balloon. The first experiment was made from the cupola of the Cathedral of Isaac, and the subject photographed was the Winter Palace. The plates were packed in envelopes impenetrable to the light, and then tied to the feet of the pigeons, who safely and quickly carried them to the station at Volkovo.

THE current issue of the *Kew Bulletin* opens with a memorandum on the use of the flowers of *Calligonum* as an article of food in North-Western India. From a note from Mr. Duthie, of the Botanical Department of Northern India, it seems that the flowers of the *Calligonum polygonoides*, locally known as *phog*, are gathered and used by the poorer classes. They are either mixed with flour, in the proportion of a third *phog* to flour, or are eaten separately with salt and condiments, to which those who can afford it add a little glue. The flowers are swept up as they fall, and are kept for a night in a closed earthenware vessel, so as to fade. Sometimes they are kneaded up in the thin atta, about a fourth flowers to three-fourths atta, and baked in cakes and eaten. The flowers sent home have been analyzed by Prof. Church, who states that the chief peculiarity of these flowers, from a dietetic point of view, is their richness in nitrogenous compounds, and that there is rather a close resemblance in composition between *phog* and the seeds of the edible amaranths and buckwheats, only sugar replaces starch. There are also a short note from Dr. Ernst, of Caracas, Venezuela, on the earliest mention of coca, and a memorandum on the *Buazé* fibre, which the natives living around Lake Ngami use to make fishing-nets. The efforts which are being made to catalogue and publish the notices of Chinese plants scattered through botanical literature and to enumerate in systematic order the species of which specimens are to be found in the British Museum and in Kew, are described. Finally, there are two notes on vine cultivation and the Phylloxera, one being the substance of the report, made by Mr. Dyer in 1881, of the conclusions of the International Congress at Bordeaux, which he attended as the representative of certain Colonial Governments; and the other a report on the vineyards of the Cape Colony, by M. Mouillefert, Professor of Viticulture in the French School of Agriculture at Grignon.

ACCORDING to the Naples Correspondent of the *Daily News*, the scientific excursion to the volcanic regions of Italy, which commenced on the 14th inst., under the direction of Dr. H. J. Johnston-Lavis, of Naples, is exciting great interest. The affair is under the special patronage of Signor Boselli, the Minister of Public Instruction, of several Italian communes, and of the London and Italian Geological Societies. The general director is Dr. Johnston-Lavis, and the secretary in London is Dr. J. Fullerton. The visits to the various notable places will be personally conducted by Prof. Struver, of Rome; Prof. Silvestri, of Catania; Profs. Sacchi and Bassani, of Naples; Dr. Johnston-Lavis, and several others. The English, Belgians, and Italians who joined in the excursion were received at Naples, which was the starting-point, on the Sunday, by the Syndic of Naples, who also intends to give a banquet to the visitors, tickets for the theatres, and to show them other attentions during their visit to the city. Serious business commenced on the 16th inst., with a voyage to the Æolian Islands and Sicily the culminating point of this part of the programme being an ascent of Etna, which is fixed for the 29th inst. A special steamer or steam yacht will be either engaged or lent for this journey. The return to Naples will take place on the 30th inst. From the 1st to the 14th of October the head-quarters will be Naples. During this time excursions will be made to the Phlegiæan Fields, Vesuvius, the craters of Campania, the islands, and the coast towns of the Gulf, and visits paid to the sights of the city, the museums, while lectures, conversaziones, and garden parties will afford relaxation from the harder scientific work. On the 15th and 16th the volcanic groups of Monte Rocca-Monfina and the celebrated monastery of Monte Cassino will be visited, and from the 17th to the 29th Rome and its volcanic neighbourhood will be examined. Among the notable spots to be visited are Capo di Bove, Monte Tuscolo, Monte Porzio, Rocca-di-Papa, Monte Cavo, Lago di Albano, Nemi, Monte Mario, Bagno di Tivoli, Tivoli, Monte Cimmino, Monte Venere, and the crater of Vico, Frascati, and many famous villas. On the 30th of October the members will separate at Viterbo, going each their own way. The Minister of Public Instruction has accorded many facilities, such as reduced fares to the intending travellers, and the director and secretaries are using every effort to render the tour a complete success. Apart from the scientific interest of the excursion, it will afford an unexampled opportunity for becoming acquainted with some of the most beautiful and picturesque parts of Italy and Sicily.

IN a Report presented to the Foreign Office by the British Consul at Florence, there is a very full account of the forests on the north-eastern boundary of Italy, which in that region are superintended by a large staff of officials. In the mountainous regions the maintenance of the forests is an absolute necessity, but, unfortunately, many slopes have become quite denuded through reckless cutting in the past. The actual extent of forest area has, however, increased since the sixteenth century, but energetic measures are now needed to prevent many of the woods deteriorating any further. Complaints are made by those who are anxious to preserve the forests that the peasants are not taught the value of them, and that in the elementary schools the principles of woodcraft and agriculture are never taught. Of the whole area under timber, the State owns only 3·42 per cent., while the *communes* possess 79·93 per cent., and private owners 16·63 per cent. As a rule the communal management is very reckless, and the forests have suffered so much that it has been seriously considered that the woods should be divided up amongst the peasants; but it is more than probable that this remedy would prove worse than the disease. The timber in the Cadore country is said to be the best in the world. Amongst the trees of the region are—the common Norway spruce, which flourishes at an altitude of 2400 metres above the level of the Adriatic, and grows to a height of about 30 metres; a variety of the Norwegian spruce, resembling the beech in its fibres, with harder wood, shorter leaves, and smaller cones than the common spruce; the common silver fir, which grows in the mountains 1500 metres above the Adriatic, and reaches a height of 25 metres; the common larch, the Scotch fir, the Mugho pine, the Swiss stone pine, the beech, and the walnut.

FROM the general results of the Swiss census of December 1, 1888, which have already been worked out, it seems that the total population is 2,934,055, against 2,846,102 in 1880. The German-speaking element increased from 2,030,792 in 1880 to 2,092,562, which, taking into account the normal growth of the population, was no relative increase, the proportion in both cases being precisely 71·3 per cent. of the whole. The French, on the other hand, increased from 608,007 to 637,940, which was also a relative increase of 21·4 to 21·7 per cent.; while the Italian declined actually as well as relatively, the numbers being 161,923 in 1880 and 156,602 in 1888, or 5·7 and 5·3 per cent. respectively. The decline of the Italians in the Cantons of Uri and Schwyz is explained by the return home of a large number of Italian workmen engaged in the St. Gothard Railway; but it is not so easy to explain why there is a large decrease in the Germans in the Cantons of Berne and Neuchâtel, while the French have increased. In general the French increase in Switzerland seems to be at the expense of the Germans, while the German element recovers its place at the expense of the Italian.

WE have received a "Guide to Technical and Commercial Education," drawn up by the executive Committee of the Dundee and District Association for the Promotion of Technical and Commercial Education. It is intended to fulfil one of the objects for which the Association was promoted, viz. "To draw up a syllabus for the district, in which shall be suggested such courses of education as shall be most suitable for particular trades; and further, to indicate (*a*) the number of years required for the complete education, (*b*) the total cost, and (*c*) the institutions in which the necessary instruction may be obtained." We draw special attention to this "Guide," as it cannot fail to be of the utmost use to similar Associations elsewhere, especially as it is drawn up with reference to the Science and Art examinations and those of the City Guilds. A definite order of study is suggested and recommended in a number of subjects, such as commerce, civil, mechanical, and electrical engineering, architecture, art industries, textiles, ship-building, gas manufacture, &c. The courses have evidently been compiled with great care and patience, and with the aid of practical men in the various subjects treated.

AMONGST the books to be published by Messrs. Crosby Lockwood and Son during the coming publishing season are:—"The Art of Paper Manufacture," by Alexander Watt; "A Hand-book on Modern Explosives," by M. Eissler; "Engineering Estimates, Costs, and Accounts," by a General Manager; "The Mechanical Engineer's Office Book," by Nelson Foley, second edition; "The Practical Engineer's Hand-book," by Walter S. Hutton, third edition; "Electric Light, its Production and Use," by J. W. Urquhart, third edition; "The Fields of Great Britain," a text-book of agriculture adapted to the Syllabus of the Science and Art Department, by Hugh Clements, second edition. And the following new editions in Weale's Rudimentary Scientific Series:—"Metallurgy of Iron," by H. Bauerman; "The Mineral Surveyor and Valuer's Complete Guide," by W. Lintern; "Stationary Engine Driving," by Michael Reynolds; "Irrigation and Water Supply," by Prof. John Scott.

MR. T. J. P. JODRELL, of Yeardsley, Cheshire, sometime of Stratton Street, London, whose death, as recently announced in the *Times*, took place on the 3rd inst., in his eighty-second year, was the founder of the Jodrell Fund, a capital sum of £6000 having been given by him to the Royal Society in the year 1876 for scientific purposes.

THE additions to the Zoological Society's Gardens during the past week include a White-fronted Lemur (*Lemur albifrons* ♂) from Madagascar, presented by Mr. C. O. Pelly; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. H. B. Wedlake; a Brown Bear (*Ursus arctus*) from Russia, presented by Mr. Frank Dugdale; a Crested Porcupine (*Hystrix cristata*) from Africa, presented by Mrs. Lucas-Shadwell; three African Lepidosirens (*Protopterus annectans*) from the River Gambia, West Africa, deposited; a Burchell's Zebra (*Equus burchelli* ♀), from South Africa, four Larger Tree Ducks (*Dendrocygna major*), three Indian Tree Ducks (*Dendrocygna javanica*) from India, a Tuberculated Iguana (*Iguana tuberculata*) from Brazil, purchased; a Red Kangaroo (*Macropus rufus* ♂), two Cockateels (*Calopsitta novæ-hollandiæ*), a Crested Pigeon (*Ocyphaps lophotes*), a Nicobar Pigeon (*Calœnas nicobarica*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET 1889 *e* (DAVIDSON).—The following ephemeris for Greenwich midnight for this object is in continuation of that given in NATURE for August 29 (p. 424):—

1889.	R.A. h. m. s.	Decl. ° ′	Log Δ.	Log *r*.	Brightness.
Sept. 29	17 14 19	32 6·5 N.	0·1635	0·1940	0·03
Oct. 3	17 21 53	32 38·5	0·1829	0·2064	0·02
7	17 29 28	33 8·2	0·2011	0·2186	0·02
11	17 37 7	33 36·1 N.	0·2182	0·2306	0·02

The brightness at discovery is taken as unity.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 SEPTEMBER 29—OCTOBER 5.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on September 29

Sun rises, 5h. 59m.; souths, 11h. 50m. 11·7s.; daily decrease of southing, 19·5s.; sets, 17h. 41m.: right asc. on meridian, 12h. 23·9m.; decl. 2° 35′ S. Sidereal Time at Sunset, 18h. 16m.

Moon (at First Quarter October 2, 2h.) rises, 11h. 8m.; souths, 15h. 40m.; sets, 20h. 4m.: right asc. on meridian, 16h. 14·4m.; decl. 18° 29′ S.